



Pesticide fate in tropical wetlands of Brazil: An aquatic microcosm study under semi-field conditions

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Abstract:

A contamination of off-site aquatic environments with pesticides has been observed in the tropics, yet only sparse information exists about pesticide fate in such ecosystems. The objective of our semi-field study was to elucidate the fate of alachlor, atrazine, chlorpyrifos, endosulfan, metolachlor, profenofos, simazine, and trifluralin in the aqueous environment of the Pantanal wetland (MT, Brazil). To this aim, water and water/sediment microcosms of two sizes (0.78 and 202 l) were installed in the outskirts of this freshwater lagoon environment and pesticide dissipation was monitored for up to 50 d after application. The physical-chemical water conditions that developed in the microcosms were reproducible among field replicates for both system sizes. Pesticide dissipation was substantially enhanced for most pesticides in small microcosms relative to the large ones (reduced DT50 by a factor of up to 5.3). The presence of sediment in microcosms led to increased persistence of chlorpyrifos, endosulfan, and trifluralin in the test systems, while for polar pesticides (alachlor, atrazine, metolachlor, profenofos, and simazine) a lesser persistence was observed. Atrazine, simazine, metolachlor, and alachlor were identified as the most persistent pesticides in large water microcosms (DT50 \geq 47 d); in large water/sediment systems endosulfan β , atrazine, metolachlor, and simazine showed the slowest dissipation (DT50 \geq 44 d). A medium-term accumulation in the sediment of tropical ecosystems can be expected for chlorpyrifos and endosulfan isomers (11-35% of applied amount still extractable at 50 d after application). We conclude that the persistence of the studied pesticides in aquatic ecosystems of the tropics is not substantially lower than during summer in temperate regions.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Food/Water Quality

Food/Water Quality: Chemical

Geographic Feature:

resource focuses on specific type of geography

Tropical

Climate Change and Human Health Literature Portal

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Central/South America

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified